CHAPTER 4. PROBLEMS AND OPPORTUNITIES

Both the ARWRI and WFA identify increased water supply needs resulting from planned growth in Placer and Sacramento counties, and recognize the importance of preserving the lower American River for its fishery, wildlife, recreational, and aesthetic values. The ARWRI identifies an environmentally preferred alternative that includes additional surface water diversions and regional conjunctive management. The WFA represents a locally initiated, regional solution to developing a strategic plan that (1) provides a reliable and safe water supply for the region's economic health and planned development to year 2030, and (2) preserves the fishery, wildlife, recreational, and aesthetic values of the lower American River.

WATER FORUM AGREEMENT AND A SACRAMENTO RIVER DIVERSION

To implement the objective of preserving the lower American River, the WFA signatories agreed on a set of year-type-dependent limitations on diversions from the American River, provided all required conditions were satisfied. **Table 4-1** shows American River Basin water year types defined in the WFA (Water Forum year types).

Table 4-1. American River Basin Water Year Types Defined in the WFA

Water Forum Year Type	Unimpaired Inflow to Folsom Lake, March – November (AF)	Occurrence Frequency, 1901 through 2002[1]
Wet	Greater than 1,600,000	63 out of 102 years (62%)
Average	Greater than 950,000 and less than 1,600,000	25 out of 102 years (24%)
Drier	Greater than 400,000 and less than 950,000	12 out of 102 years (12%)
Driest	Less than 400,000	2[2] out of 102 years (2%)

[1] Data source: California Data Exchange Center (CDEC).
[2] 1924 and 1977.

WFA Limitations and Assumptions on Diversions from the American River

Tables 4-2 and 4-3 summarize WFA limitations on diversion for the cost-sharing partners (i.e., PCWA, SSWD,[11] Roseville, and Sacramento), from the American River. The year-type-dependent limitations on diversion from the American River are within one of the seven elements in the WFA, and stipulated in their corresponding WFA Purveyor Specific Agreement (PSA). Note that most of the purveyors are limited by diversion amount; however, Sacramento is limited by the allowable diversion rate at Fairbairn WTP on the bypass flow rate, and limited by the total annual diversion at Fairbairn WTP in Water Forum driest years.

[11] SSWD was formed in 2002 through consolidation of the former Arcade Water District (AWD) and the former Northridge Water District (NWD). NWD has a water sale agreement with PCWA for 29,000 AF of Middle Fork Project (MFP) water used in a groundwater stabilization program. In 2000, as part of the WFA, NWD entered into a PSA containing provisions for delivery of 29,000 AF from PCWA's MFP. Following the consolidation, these provisions were applied to the former NWD's service area of SSWD. AWD was not a WFA signatory. Currently, SSWD has a draft consolidated PSA that is under review by the Water Forum Successor Effort.

Table 4-2. Summary of WFA Limitations on Diversions from the American River for PCWA, SSWD, and Roseville

Water Purveyor	WFA Limitations on Annual Diversion from the American River[1] (AF)	Source	Notes[1]
PCWA	35,500	MFP	
SSWD	29,000	MFP	Wet years only
	26,064[2]	Water rights	Wet/average years only
	3,500[2]		Drier/driest years only
Roseville	58,900[3]	MFP and CVP[5]	Wet/average years only
	39,800 to 54,900[4]		Drier years only
	39,800		Driest years only

[1] See **Appendix A** for details.
[2] Based on the draft PSA for SSWD currently under review by the Water Forum Successor Efforts. See footnote on page 4-1.
[3] Includes 4,000 AF of water transferred from SJWD.
[4] Linearly proportional based on March-through-November unimpaired inflow to Folsom Lake between 400,000 and 950,000 AF.
[5] WFA limitations are on the total amount of diversions from these two contract entitlements.

Table 4-3. Summary of WFA Limitations on Sacramento's Diversions at Fairbairn WTP under its Water Rights

Criteria	Period	Maximum Diversion Rate at Fairbairn WTP (cfs)
If the flow bypassing the diversion at the FWTP is greater than the Hodge Flow Condition[1],[2]	1/1 – 12/31	310
If the flow bypassing the diversion at the FWTP is less than the Hodge Flow Condition[1],[3],[4]	1/1 – 5/31	120
	6/1 – 8/31	155
	9/1 – 9/30	120
	10/1 – 12/31	100

[1] Hodge Flow Condition: Parties to the litigation (*Environmental Defense Fund et al. v. East Bay Municipal Utility District*) cannot divert water from the American River unless instream flows measure at least 2,000 cfs from October 15 through February; 3,000 cfs from March through June; and 1,750 cfs from July through October 14.
[2] In accordance with wholesale agreements, Sacramento may deliver water diverted or treated at Fairbairn WTP to public or private water purveyors on a wholesale basis anywhere within the POU as it existed on January 1, 1997.
[3] Water diverted or treated at Fairbairn WTP may be delivered on a wholesale or wheeling basis to any public or private water purveyors provided the rate of "pumpback" is equal to or exceeds the rate of delivery for these purposes on a daily basis. "Pumpback" is used to assume the existence of a metered raw water conveyance facility delivering water from near the confluence of the Sacramento and American rivers to the Fairbairn WTP.
[4] For all conditions in extremely dry years (Water Forum driest years and/or annual projected unimpaired inflow into Folsom Lake is 550,000 AF or less), and the annual diversion from Sacramento's water rights is further limited to 50,000 AF.

A comparison of these limitations to the water rights and SRWRS cost-sharing partners' water rights and contract entitlements listed in **Table 3-3** suggests affected water-right diversions and contract deliveries include the following:

- PCWA's MFP water right diversion of 500 AF per year, and its CVP contract delivery of 35,000 AF per year
- SSWD's water contract delivery of 29,000 AF per year from PCWA's MFP in Water Forum average, drier, and driest years
- Roseville's water contract delivery of up to 7,100 AF per year from either CVP or PCWA's MFP
- A portion of Sacramento's water-righted diversion from the American River at its Fairbairn WTP. The WFA limitations provide that up to 100 mgd, or 155 cfs, of diversion from the American River would be forgone during summer months when peak demand occurs. However, the resulting

quantity varies by hydrologic condition, precluding easy quantification of potential effect of these limitations.

The aforementioned limitations on diversions from the American River for PCWA, SSWD, and Sacramento were negotiated on the basis that these water purveyors would be able to divert the forgone amount from a diversion on the Sacramento River. Currently, PCWA and SSWD lack access to diversions on the Sacramento River or exchange agreements for such diversions. Similarly, Sacramento has a need for adequate diversion capacity on the Sacramento River to recover the forgone diversion at its Fairbairn WTP and provide surface water for retail, wholesale, and wheeling services to the region on a maximum day (max-day) basis.[12]

Gaps Between Projected Demand and Supply in Absence of a Sacramento River Diversion

An assessment of long-term water supply needs for cost-sharing partners is presented in **Appendix A**, which details existing water rights and entitlements and the gaps between projected 2030 demands and water supplies. **Tables 4-4 and 4-5** show projected demands and supplies considered for SRWRS cost-sharing partners in the assessment.

Table 4-4 Projected 2030 Water Supply Demand by Cost-Sharing Partner Considered in the Assessment of Long-term Water Supply Needs

Water Purveyor	Purpose of Use	Projected 2030 Annual Demand (AF)	Note (See Appendix A for details)
PCWA	Agricultural	140,000	Includes raw water users along PCWA canal system
	M&I	85,400	Based on a slow-growth projection; a future realized growth greater than the assumed slow-growth projection would result in additional unmet demand.
SSWD	M&I	92,227	Includes wholesale service area
Roseville	M&i	64,020	Includes the current city limit and potential annexation of the MOU area.
Sacramento	M&I	257,245	Including the current city limit, the American River Place of Use, and the Natomas City-County Joint Vision area.

[12] The estimated max-day demand is commonly presented in mgd and used as the design capacity for water supply facilities.

Table 4-5. Future Surface Water Supplies and Diversion Points Considered in the Assessment of Long-term Water Supply Needs

Water Purveyor	Annual Surface Water Supply[1] (AF)	Source	Diversion Point	Note
PCWA	35,500	MFP	ARPS	Assumes construction is completed.
	100,400	PG&E	Canal buy points[2]	
SSWD	29,000	MFP	Folsom Dam	Wet years only, for a regional groundwater stabilization project.
Roseville	Up to 54,900	MFP and CVP[3]	Folsom Dam	Assumes currently master-planned WTP expansion is completed.
	4,000	MFP	Folsom Dam	MFP water transferred from SJWD in wet and average years only.
Sacramento	Up to 326,800[4]	Water rights, water wheeling	Fairbairn WTP, Sacramento WTP	Assumes the ongoing expansions of these two WTPs are completed.

[1] Subject to applicable WFA limitations on diversion in dry years; see **Attachment A** for details.
[2] Along the canals of PG&E's Drum-Spaulding System.
[3] WFA limitations are on the total diversion from these two contract entitlements.
[4] Sacramento River water rights: 81,800 AF per year; American River water rights: 245,000 AF per year.

The assessment of water supply needs also includes the consideration of replacement water release, a potentially non-consumptive demand, by PCWA and Roseville. Under the WFA, PCWA would release up to 47,000 AF per year of replacement water (27,000 AF per year for PCWA and 20,000 AF per year for Roseville) in Water Forum drier and driest years to the American River from reoperation of PCWA's MFP reservoirs. The purpose of the replacement water is to offset reductions in flows of the lower American River due to increased future PCWA and Roseville diversions during drier and driest years. The replacement water would remain in the American River until it reaches its confluence with the Sacramento River. However, PCWA has agreed to release the replacement water from its MFP reservoirs only when a water transfer partner exists below the American River outlet. **Table 4-6** summarizes the responsibilities of providing replacement water as stipulated in the WFA. The reoperation of MFP reservoirs to provide replacement water may be subject to refill conditions currently under negotiation between Reclamation and PCWA.

Table 4-6. Responsibility of Providing Replacement Water under PCWA's and Roseville's WFA PSA

Water Forum Year Type	Annual Amount of Replacement Water[1] by Responsible Purveyor (AF)	
	PCWA	Roseville
Wet and Average	0	0
Drier	0 to 27,000[2]	0 to 20,000[2]
Driest	27,000	20,000

[1] The water will be made available by reoperation of PCWA's MFP reservoirs. Releases will be contingent on the following conditions:
a. PCWA's ability to sell the released water for use below the lower American River on terms acceptable to PCWA.
b. PG&E's agreement to such reoperation until the present power purchase contract with PG&E expires in 2013.
c. PCWA's determination that it has sufficient water in its reservoirs for additional releases to mitigate conditions in dry years without jeopardizing the supply for PCWA's customers. [Based on historical hydrology and projected 2030 requirements as set forth in the WFA, previous operational modeling shows that reoperation water should be available for such release and sale without drawing MFP reservoirs below 50,000 AF.]

[2] Linearly proportional based on March-through-November unimpaired inflow to Folsom Lake between 400,000 and 950,000 AF.

The gaps between SRWRS cost-sharing partners' projected 2030 demand and supply identified in the assessment of water supply needs are summarized below (see **Appendix A** for details).

- **PCWA and Roseville would have unmet water supply demands.** The projected unmet demand in 2030 is 34,500[13] AF per year in the PCWA service area and 5,000 AF per year in the Roseville service area (including the potential annexation area west of the current city limit).

- **Sacramento would have unmet water supply demands, especially on the basis of max-day demand.** The surface water shortage ranges from 55 to 155 mgd in the region, which in the future would rely on Sacramento for retail, wholesale, and wheeling services. Although the deficiency in diversion capacity is easily demonstrated by using max-day demand, the actual volume of unmet water supply demand due to WFA limitations varies by hydrologic conditions.

FUTURE WITHOUT PROJECT CONDITION

The Future Without Project Condition[14] describes the conditions that would likely happen in the absence of the actions considered in the SRWRS, while observing WFA limitations on diversions from the American River. These conditions include a projection of future local, CVP, and SWP demands, a collection of actions are currently authorized, funded, permitted, and/or highly likely to be implemented. In particular, the Future Without Project Condition includes actions that SRWRS cost-sharing partners would likely occur in the future to address the projected unreliable water supply conditions. The aforementioned gaps between cost-sharing partners' projected 2030 demands and supplies were used as the basis for characterizing the Future Without Project Condition.

Water Supply Reallocation to Accommodate Projected Unmet Demand

To address the projected unmet demands (gaps between projected 2030 demands and supplies), the cost-sharing partners would reallocate the available water supplies to minimize the resulting overall water supply problem. These actions by cost-sharing partners, described below, may be mutually related by ongoing regional water resources management, and/or may cause changes in the water supply availability of other cost-sharing partner.

PCWA

To address projected unmet demands, PCWA would further reallocate its water supplies in several ways, including using groundwater for M&I supply in areas allowed by applicable laws and regulations, reducing surface water delivery for agricultural use, practicing mandatory extra ordinary conservation, and reducing contract delivery to Sacramento County.

- **Use groundwater for M&I purposes in areas allowed by applicable laws and regulations.** The Placer County General Plan prohibits use of groundwater as an M&I water source. Therefore, groundwater could be used as an M&I water source only in incorporated areas with groundwater accessibility. The City of Lincoln (Lincoln) is the identified incorporated area that could be served by groundwater. The projected 2030 demand[15] for Lincoln is 19,333 AF per year.

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[13] This estimated unmet amount is based on a slow-growth projection. A future realized growth greater than the assumed slow-growth projection would result in additional unmet demand.

[14] This condition will be used as an NEPA baseline for comparison. CEQA requires that the significance of the effects of proposed projects and alternatives be determined through comparing those effects with baseline conditions that reflecting the existing "environmental setting" at the time the Notice of Preparation is issued.

[15] Consistently used in the SRWRS, PCWA's 2030 M&I demands are based on a slow-growth projection. A future realized growth greater than the assumed slow-growth projection would result in additional unmet demand. See **Appendix A** for details.

- **Reduce surface water delivery for agricultural purposes.** PCWA currently delivers surface water to its Service Zone 5 in western Placer County for agricultural use to reduce reliance on groundwater, and to the upper portion of Service Zone 1 in the foothills for agricultural and domestic uses through its canal system. These deliveries would be reduced to supplement the need for M&I supply. Agricultural users in Service Zone 5 have access to groundwater and could use groundwater as alternative source of water for their demands. However, agricultural users in Service Zone 1 do not have access to groundwater due to their foothill location, which could result in water supply deficiency.

- **Implement planned reclaimed water use for agricultural purposes.** PCWA plans to use reclaimed water of about 4,000 AF per year for agricultural use in Service Zone 5.

- **Implement mandatory extra ordinary conservation of M&I use.** Mandatory extra ordinary conservation up to ten percent[16] of surface water demand for M&I use could be imposed in Water Forum drier and driest years. The projected surface water demand for M&I use is 66,067 AF per year, assuming Lincoln would be served by groundwater. That is, the amount of mandatory extra ordinary conservation would be up to about 6,600 AF per year.

- **Reduce contract deliveries within Sacramento County.** PCWA's water sale contracts with SSWD stipulate that the delivery from PCWA's MFP be provided when PCWA has sufficient water to meet its own demands in Placer County. Under the Future Without Project Condition, PCWA experiences water supply deficiencies and thus, would reduce the delivery to SSWD by 10,000[17] AF per year in Water Forum wet years, reallocating this amount to M&I use in Placer County. The reallocated water would be delivered to PCWA's service area through SJWD's diversion at Folsom Dam. In other words, the total diversion of MFP water for SSWD and PCWA from the American River would remain within WFA limitations.

SSWD

In the Future Without Project Condition, SSWD would receive surface water deliveries from PCWA and Sacramento. As a result of PCWA's reallocation of water supply, SSWD would have a reduced surface water supply of up to 19,000 AF per year diverting from the American River at Folsom Dam during Water Forum wet years. The amount of potential reduction in Sacramento's delivery would be determined by hydrologic conditions and actions taken by Sacramento (described later in this section).

To address potential reduction in surface water deliveries from PCWA and Sacramento, SSWD would take the following actions:

- **Increase groundwater use for M&I purposes.** SSWD has access to groundwater, and has largely relied on groundwater for water supply in the past. With reduced availability of surface water supply, SSWD would use groundwater to meet projected M&I demand.

Roseville

No contractual change is anticipated for Roseville in the Future Without Project Condition. Thus, to address projected unmet demand, Roseville would take the following actions:

[16] Per discussion with PCWA staff.

[17] Estimated amount that may be diverted and treated at SJWD's Peterson WTP for PCWA after the WTP's design capacity is restored. PCWA is currently negotiating with SJWD for a dedicated treatment capacity.

- **Increase groundwater use for M&I purposes.** The projected increase in groundwater use would be up to 5,000 AF per year.

- **Implement planned use of reclaimed water for M&I purposes.** Roseville plans to use reclaimed water of up to 2,773 AF per year in Water Forum wet and average years, and up to 5,773 AF per year in driest years. During Water Forum drier years, planned use of reclaimed water would be between those of wet/average and driest years.

- **Implement planned mandatory extra ordinary conservation of M&I use.** Roseville planned to implement mandatory extra ordinary conservation of up to 6,220 AF in Water Forum driest years.

Sacramento

In the Future Without Project Condition, Sacramento would experience difficulties in providing surface water delivery for retail, wholesale, and wheeling purposes to its service area, locations within its water right POU outside of its service area, and the Natomas Joint Vision area. To address the projected unmet demand, Sacramento would take the following actions:

- **Establish priority of surface water deliveries for M&I purposes.** Sacramento would allocate available surface water to areas in the following order: the current city limit, the area north of the American River, and the area south of the American River. Serving the area north of the American River would have priority over serving the area south of the river because groundwater use in this region has already been under SGA's management. A formal authority of groundwater management has not been established for the area south of the river.

- **Increase groundwater use for M&I purposes.** Sacramento and the neighboring water purveyors who would in the future rely on Sacramento for retail, wholesale, and wheeling services have access to groundwater. Historically, most of the neighboring water purveyors have used groundwater as a primary source of water for M&I purposes. Groundwater use in the area north of American River would be consistent with SGA's management.

Preliminary Results of Hydrologic Modeling for the Future Without Project Condition

Preliminary hydrologic modeling to characterize surface water and groundwater supply conditions in the Future Without Project Condition was completed using CALSIM II[18] (CALSIM) and the North American River and Sacramento County Combined Integrated Groundwater and Surface Water Model (IGSM), respectively. The associated assumptions and modeling tools are subject to refinements as the SRWRS progresses.

Modeling Tools

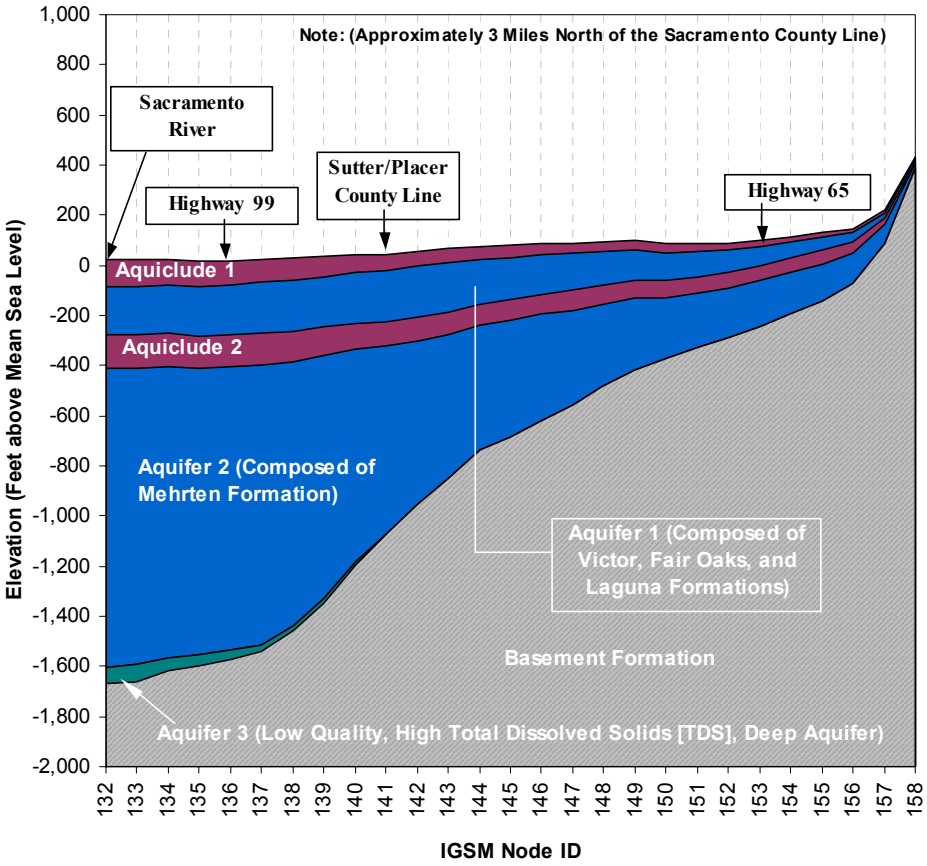
CALSIM modeling, based on the latest revision of benchmark studies dated March 2003, provides long-term statewide and local water supply outlooks in the identified Future Without Project Condition. Water supply reallocations mentioned previously are incorporated in CALSIM modeling to conform to the characteristics of the Future Without Project Condition. Although 2030 is recognized as the common planning horizon for most ongoing studies and projects, including those for CALFED ROD implementation, CALSIM benchmark

[18] CALSIM is the current hydrologic model used to support decisions for operating, planning, and managing CVP and SWP water supply and water quality. See http://modeling.water.ca.gov/ for more information on CALSIM development.

studies for a 2030 level of demand for the CVP-SWP system are not currently available. Thus, the preliminary CALSIM modeling used a 2020 level of demand.

IGSM has been used to evaluate groundwater conditions in the study area by Reclamation, DWR, and local agencies for regional planning efforts such as the ARWRI EIS and WFA EIR. IGSM accommodates input and output of land use and water use data such as demand, surface water deliveries, groundwater pumping and/or recharge, stream/aquifer interaction, and associated losses and deep percolation. The geology and geohydrology in Placer and Sacramento counties, and in particular portions of the investigation area, are complex. Consequently, the IGSM is based on a conceptual model of the groundwater basin represented by a three-layer aquifer system (see **Figure 4-1**).[19] Model specifications are consistent with assumptions used in the WFA EIR with significant updates and enhancements incorporated in the following ARBCA and SGA efforts.

Figure 4-1. Example Cross Section of Groundwater Aquifers Simulated in the IGSM



Summary of Simulated Water Supply Conditions (Preliminary Results)

Table 4-7 summarizes the preliminary results of simulated water supply conditions for the cost-sharing partners by Water Forum year type in the Future Without Project Condition. **Figure 4-2** shows the water supply conditions for the cost-sharing partners in the Future Without Project Condition. While SSWD, Roseville and Sacramento would be able to use groundwater, reclaimed water, and extra ordinary

[19] The conceptual IGSM model is largely based on geologic, hydrologic, and geohydrologic information presented in *Bulletin 118-3* (DWR, July 1974) supplemented by additional local studies.

conservation to meet the projected M&I demands. Significant deficiencies for agricultural use would occur in PCWA service area in Service Zone 1 due to lack of groundwater accessibility at its foothill location. IN addition, no surface water would be delivered to Service Zone 5 for agricultural purposes.

Figures 4-3 and 4-4 depict the groundwater elevations in wet and dry conditions in the Future Without Project Condition. Compared with the groundwater conditions shown in **Figure 3-2**, the most significant changes in Placer County are the large decline in groundwater elevations and aquifer drying along the eastern fringe near Lincoln. Groundwater pumping would severely aggravate the already vulnerable groundwater supplies of Lincoln and Roseville. In Sacramento County, the most significant change is the deepening of the existing cone of depression located in northern Sacramento County, resulting from increased groundwater use in the region.

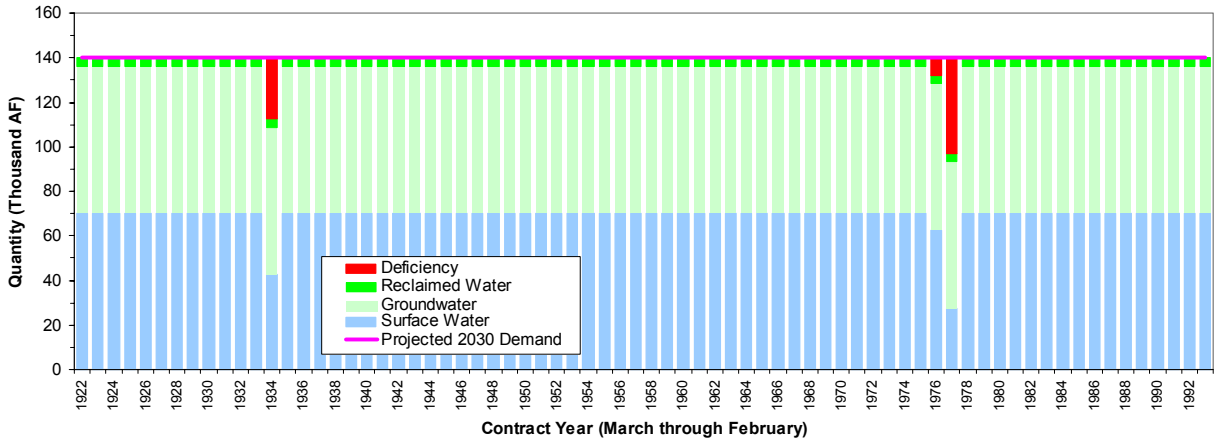
Table 4-7.
Summary of Simulated Water Supply Conditions by Water Forum Year Type in the Future Without Project Condition for SRWRS Cost-Sharing Partners (Preliminary Results)

Water Forum Year Type	Water Purveyor	Type of Use[1]	Annual Demand (AF)	Average Annual Supply (AF)				Average Annual Deficiency (AF)
				Surface Water	Groundwater	Reclaimed Water	Extra Ordinary Conservation[6]	
Wet	PCWA	Ag	140,000	70,000	66,000	4,000	0	0
		M&I	85,400[2]	75,900[4]	9,500[5]	0	0	0
	SSWD	M&I	92,300	36,300	56,000	0	0	0
	Roseville	M&I	64,000	58,000	3,200	2,800	0	0
	Sacramento	M&I	257,200[3]	193,500[3]	63,700	0	0	0
Average	PCWA	Ag	140,000	70,000	66,000	4,000	0	0
		M&I	85,400[2]	75,400	10,000[5]	0	0	0
	SSWD	M&I	92,200	15,300	76,900	0	0	0
	Roseville	M&I	64,000	57,800	3,400	2,800	0	0
	Sacramento	M&I	257,200[3]	188,900[3]	68,300	0	0	0
Drier	PCWA	Ag	140,000	66,800	66,000	4,000	0	3,200[6]
		M&I	85,400[2]	70,100	13,400[5]		1,900	0
	SSWD	M&I	92,200	2,100	90,100	0	0	0
	Roseville	M&I	64,000	43,800	17,400	2,800	0	0
	Sacramento	M&I	257,200[3]	189,400[3]	67,800	0	0	0
Driest	PCWA	Ag	140,000	48,600	66,000	4,000		21,400[6]
		M&I	85,400[2]	61,700	17,100[5]	0	6,600	
	SSWD	M&I	92,200	1,200	91,000	0	0	0
	Roseville	M&I	64,000	44,600	7,400	5,800	6,200	0
	Sacramento	M&I	257,200[3]	176,000[3]	81,200	0	0	0

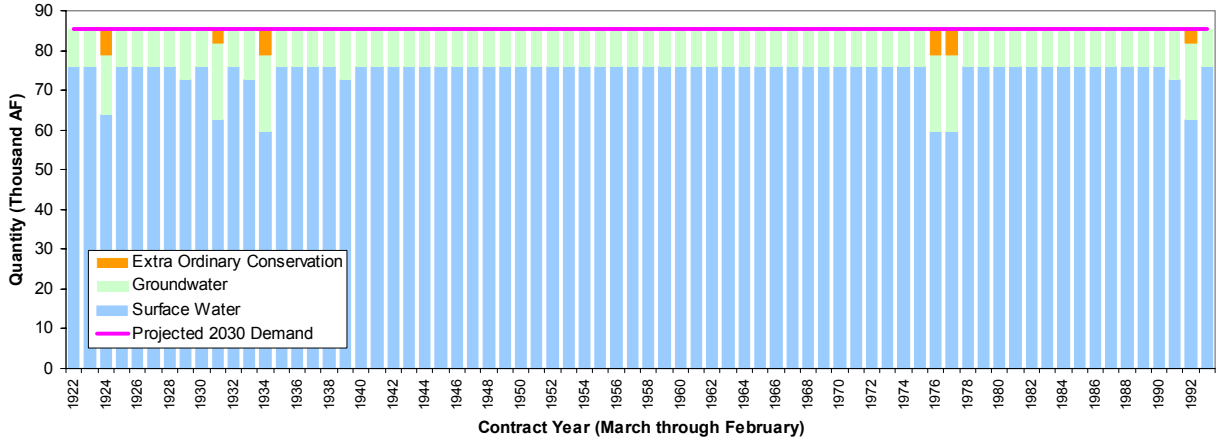
[1] Ag: agricultural use; M&I: municipal and industrial use.
[2] Based on a slow-growth projection; Based on a slow-growth projection; a future realized growth greater than the assumed slow-growth projection would result in additional demand.
[3] Includes demands and surface water deliveries to SSWD.
[4] Includes the 10,000 AF of MFP water reallocated back from SSWD.
[5] For PCWA, Groundwater is assumed to be used for M&I supply in Lincoln, an incorporated area with groundwater accessibility. The amount of groundwater supply for M&I in any given year is limited by the projected demand for Lincoln.
[6] Assumes the maximum amount of extra ordinary conservation in driest years, and a less amount could be imposed in other years when necessary. The maximum amount is 6,600 AF per year for PCWA, and 6,220 AF for Roseville. No extra ordinary conservation is scheduled for SSWD and Sacramento. See **Appendix A** for details.
[7] Agricultural deficiency in areas without groundwater accessibility.

Figure 4-2. Simulated Water Supply Conditions for SRWRS Cost-Sharing Partners in the Future Without Project Condition (Preliminary Results)

(a) PCWA (Ag) (Preliminary Results)



(b) PCWA (M&I) (Preliminary Results)



(c) SSWD (M&I) (Preliminary Results)

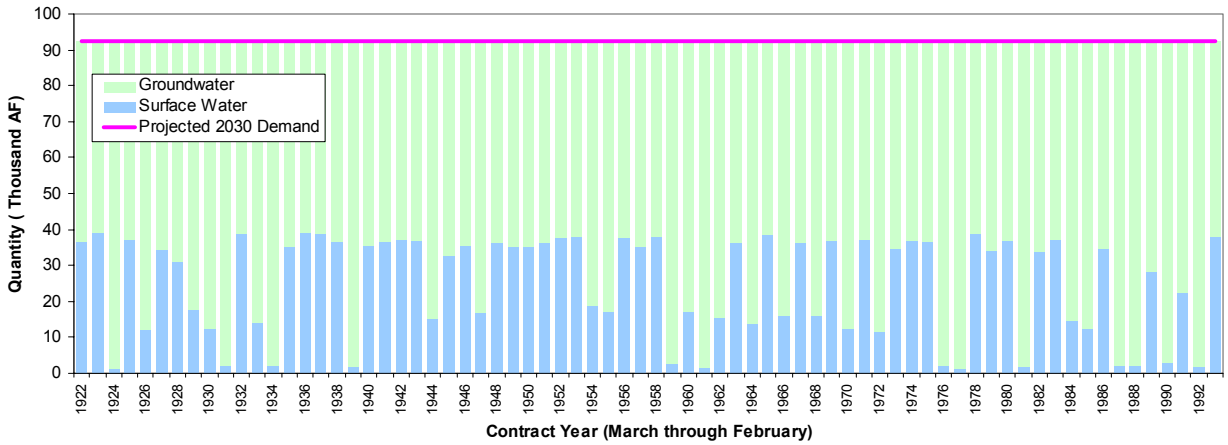
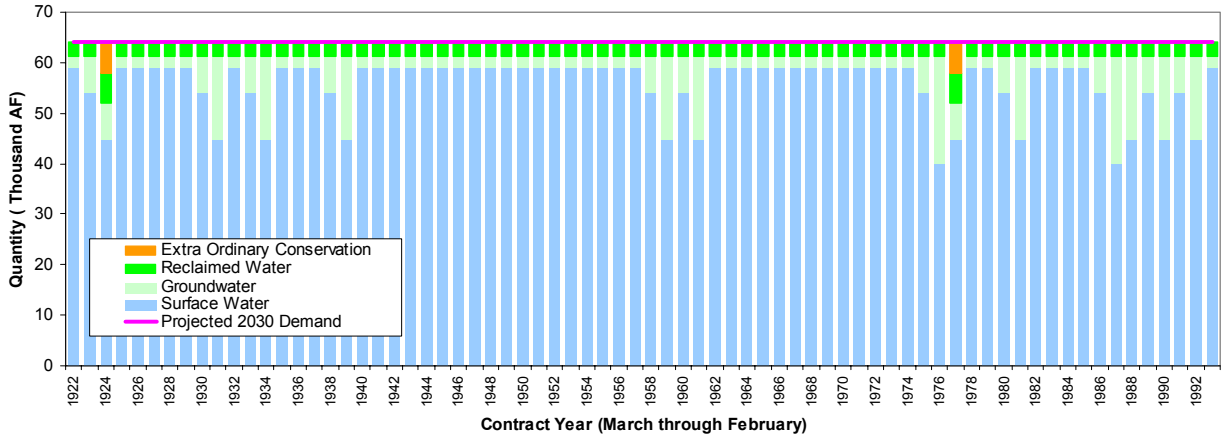
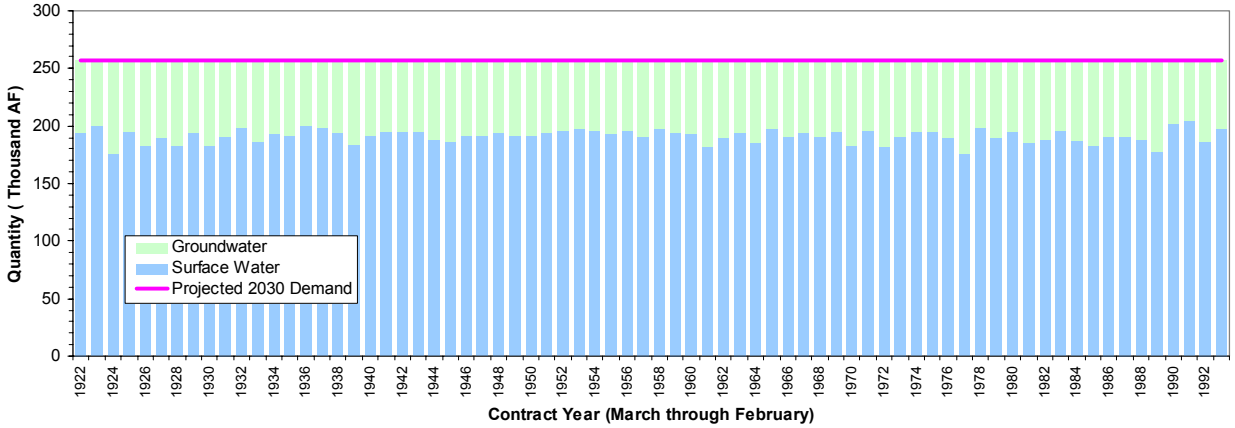


Figure 4-2. Simulated Water Supply Conditions for SRWRS Cost-Sharing Partners in the Future Without Project Condition (Preliminary Results)

(d) Roseville (M&I) (Preliminary Results)



(e) Sacramento (M&I) (Preliminary Results)



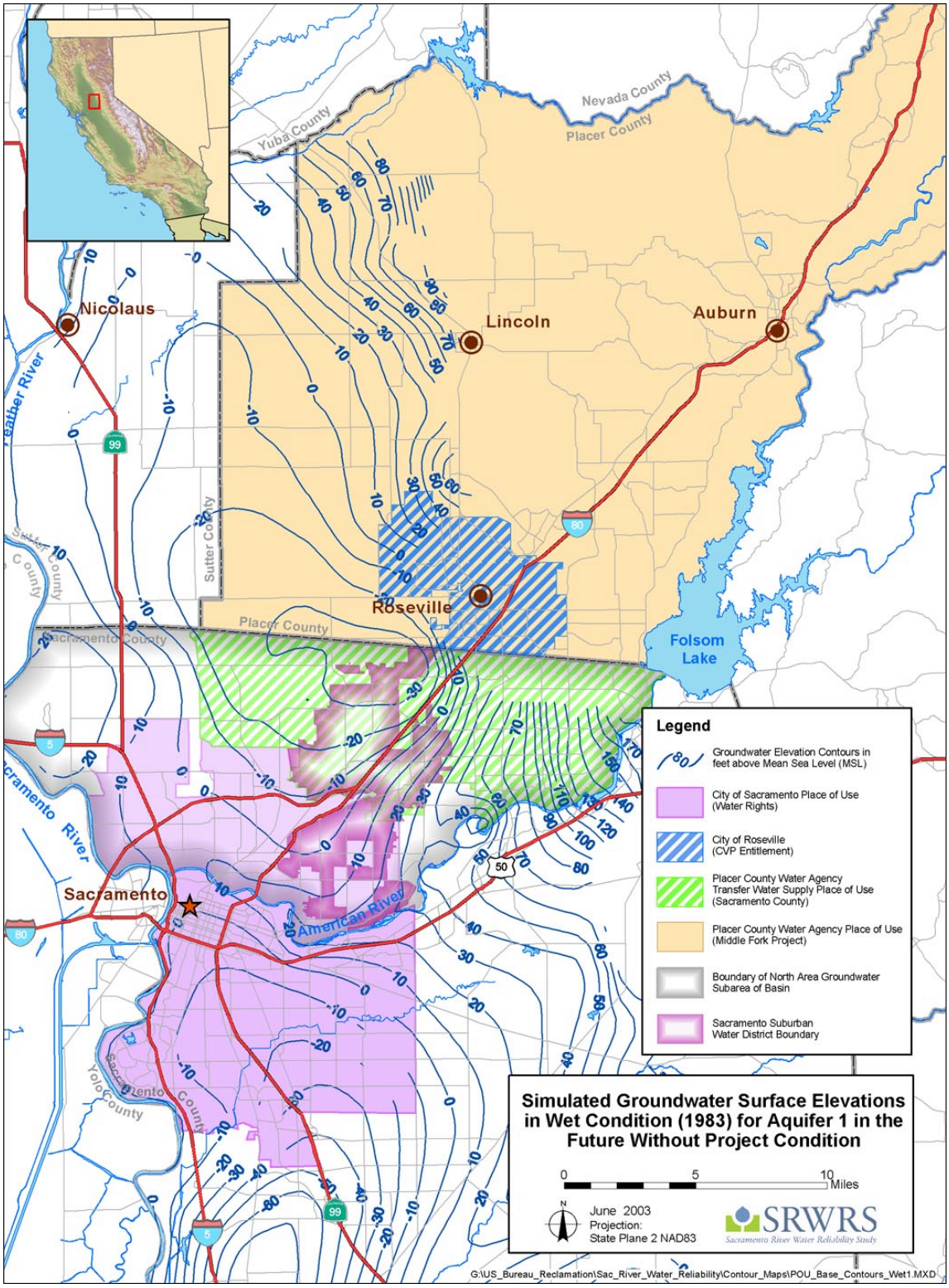


Figure 4-3. Simulated Groundwater Elevations in 1983 (a Water Forum Wet Year) in the Future Without Project Condition (Preliminary Results)

(a) Aquifer 1

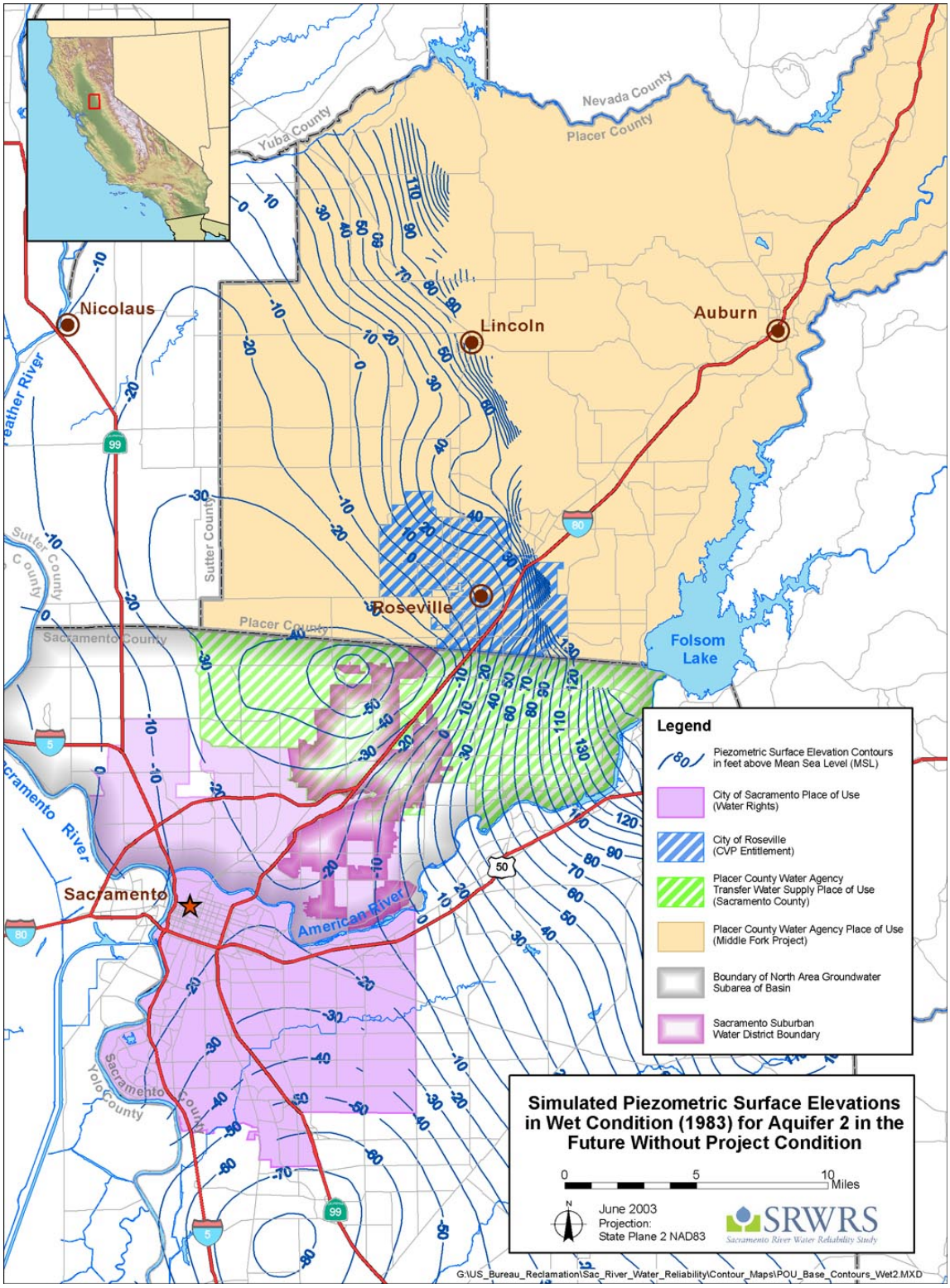


Figure 4-3. Simulated Groundwater Elevations in 1983 (a Water Forum Wet Year) in the Future Without Project Condition (Preliminary Results)

(b) Aquifer 2

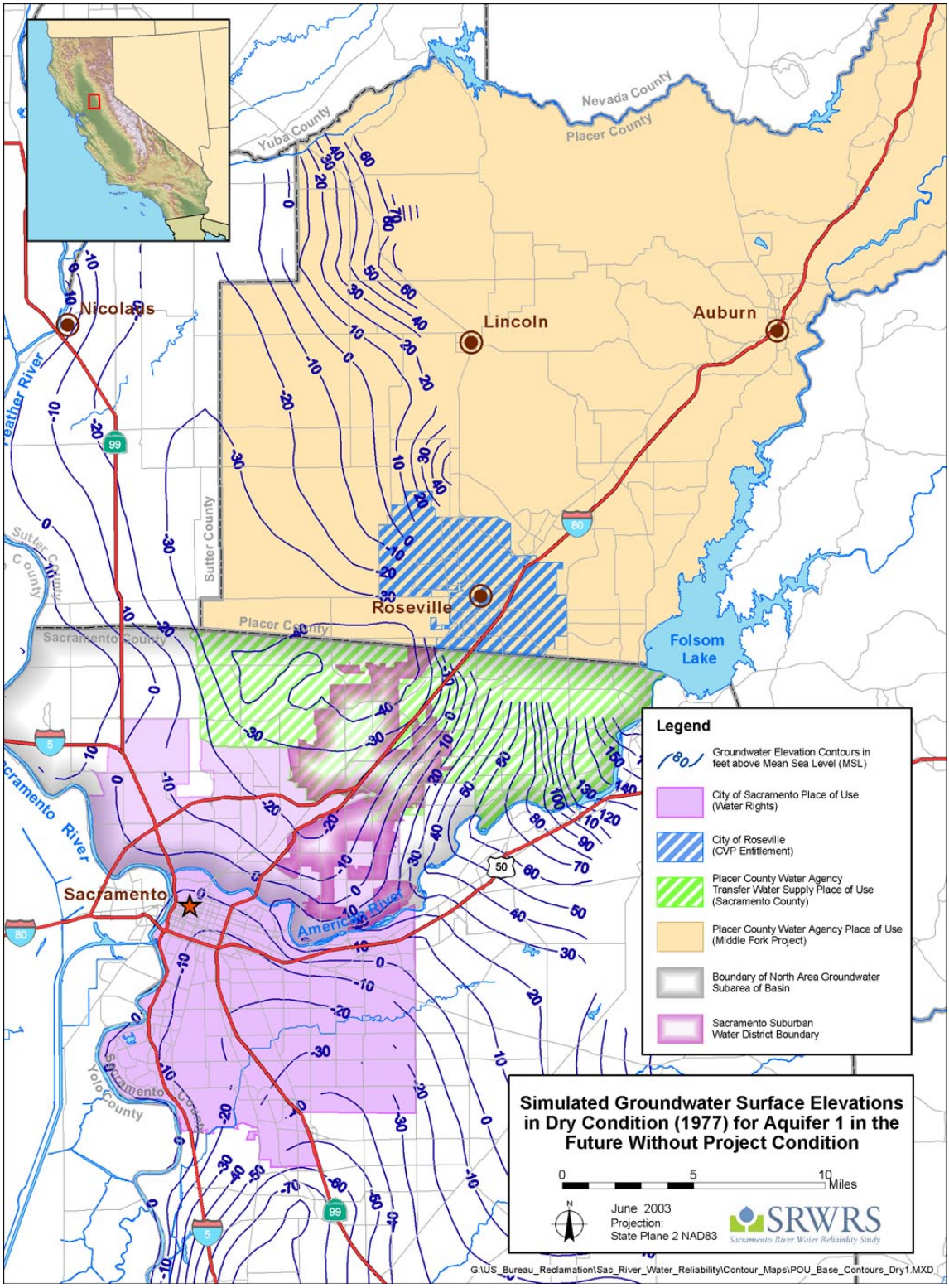


Figure 4-4. Simulated Groundwater Elevations in 1977 (a Water Forum Driest Year) in the Future Without Project Condition (Preliminary Results)

(a) Aquifer 1

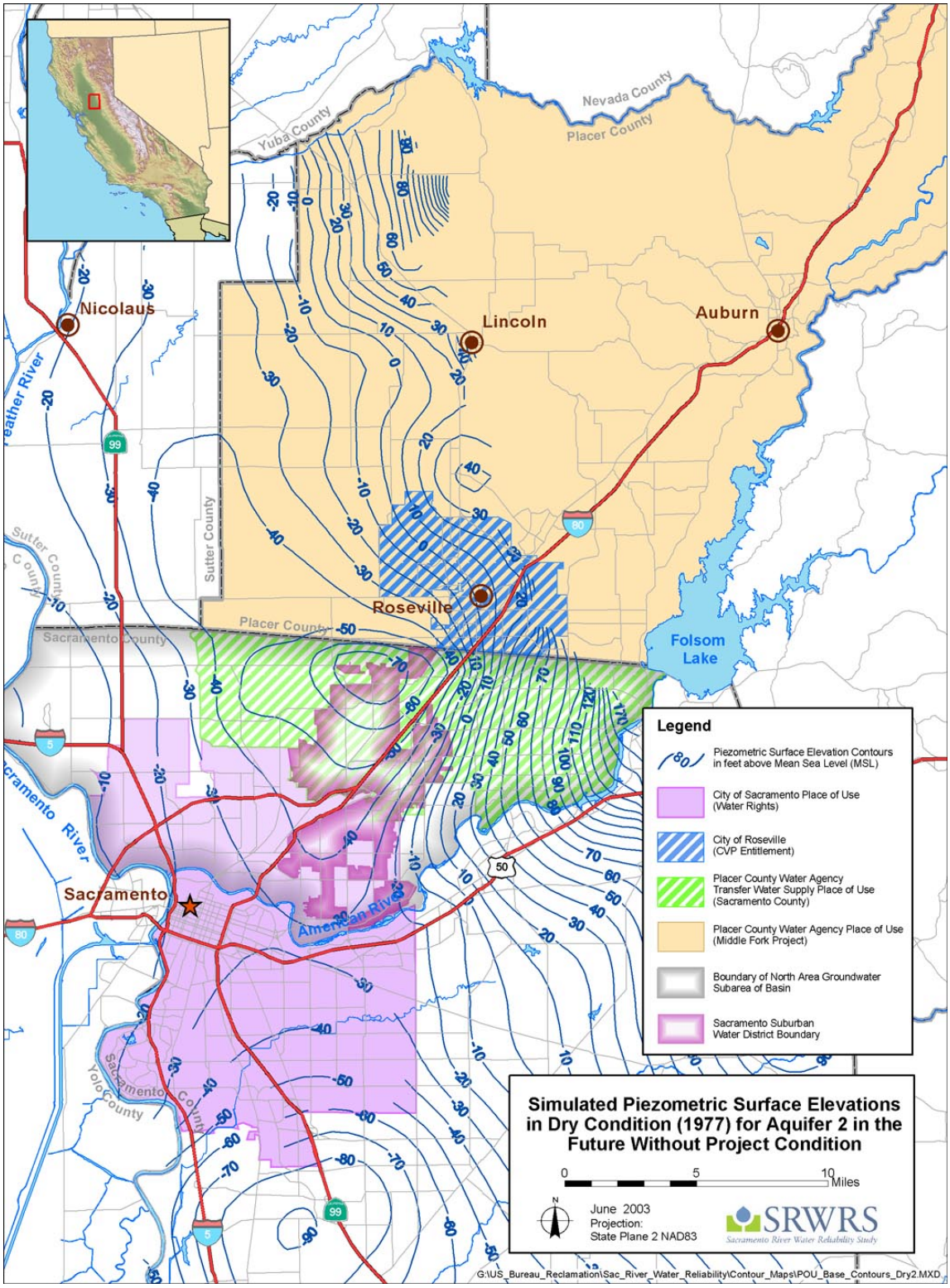


Figure 4-4. Simulated Groundwater Elevations in 1977 (a Water Forum Driest Year) in the Future Without Project Condition (Preliminary Results)

(b) Aquifer 2

IDENTIFIED PROBLEM AND OPPORTUNITIES

Problems are main issues that the SRWRS actively plans to resolve in alternative development; **opportunities** are ancillary benefits that could be anticipated while implementing the selected plan to resolve the identified problems. The following provides a summary of the identified problem and opportunities based on the Future Without Project Condition; a detailed discussion for each problem and opportunities are provided in the subsequent discussion.

- **Loss of water supply reliability in the Sacramento/Placer county region (Problem)** — This problem is a direct consequence of implementing WFA limitations on diversions from the American River without a Sacramento River diversion. The loss of water supply reliability would result in active reallocation of existing water supplies between agricultural and M&I uses, increased use of groundwater, and loss of conjunctive management opportunities envisioned in the WFA.

- **CVP operational efficiency (Opportunity)** — As an integral part of the CVP, Reclamation operates Folsom Dam to meet CVP demands, flood control purposes, and environmental water needs in the lower American River and in the Delta. Developing a diversion to address the above water supply problem from a river other than the American River would allow Reclamation maintain CVP operational efficiency to use water of high quality from the American River Basin in meeting Delta environmental water demands.

- **Ecosystem preservation in the lower American River (Opportunity)** — The WFA was developed as an integral plan to secure regional water supply reliability and preserve the lower American River. Developing a diversion to address the above water supply problem from a river other than the American River would allow the WFA to be implemented as it was originally envisioned.

While the WFA provides a blue print of regional comprehensive solution, individual projects required to support the WFA are currently under development through efforts of WFA signatories (both individually or collectively). A Sacramento River diversion is a key component of the WFA strategy for providing a safe and reliable water supply in the Sacramento-Placer county region while preserving the fishery, wildlife, and aesthetic values of the lower American River. The identified water supply problem stems from the inconsistency between the WFA's vision and availability of a Sacramento River diversion. Finding a solution to address the water supply problem would allow implementation of WFA's original vision and thus, promote the identified opportunities of maintaining CVP operational efficiency and promoting ecosystem preservation in the lower American River.

Loss of Water Supply Reliability (Problem)

If WFA signatories implements the WFA without a Sacramento River diversion, while observing the limitations on diversions from the American River, the following direct consequences would occur within the region:

- **Significant unmet demands resulting from existing beneficial uses and planned growth.**

  The projected unmet demands in 2030 are about 34,500[20] AF per year in the PCWA service area and up to 5,000 AF per year in the Roseville service area. The surface water shortage ranges from 55 to 155 mgd in the region where in the future, would rely on Sacramento for retail, wholesale, and

[20] The estimated unmet amount is based on a slow-growth projection. A future realized growth greater than the assumed slow-growth projection would result in additional unmet demand. See **Appendix A** for details.

wheeling services. The actual volume of unmet demand varies by hydrologic conditions. (See **Appendix A** for details.)

- **Significant reductions in surface water delivery to agricultural users in PCWA service area.**

  The projected unmet demands of PCWA would translate into reductions in surface water delivery to agricultural uses. While groundwater can be extracted in Zone 5 to meet the projected demand, PCWA Zone 1 would experience up to 30 percent of mandatory extra ordinary conservation originated from water supply shortage and lack of groundwater access in its foothill location.

- **Significant groundwater impacts resulting from meeting unmet demands in PCWA and Roseville service areas.**

  The projected unmet demands of PCWA and Roseville would translate into further groundwater use directly or indirectly. PCWA would reallocate the available surface water including reduction in surface water allocation to agricultural use and use groundwater as main M&I supply in areas where allowed by local governing regulations (e.g., in the Lincoln). Roseville would increase groundwater use to meet the unmet demand.

- **Significant loss of in-lieu groundwater recharge opportunity for regional conjunctive management in Sacramento-Placer counties.**

  Limitations on SSWD's diversion of 29,000 AF per year from its contract entitlement in non-wet years (38 percent of years) would result in a reduction of at least 38-percent in-lieu recharge benefit associated with the PCWA-SSWD groundwater stabilization project. Roseville is currently developing an aquifer storage and recharge (ASR) program to facilitate conjunctive management that may not be implementable without a Sacramento River diversion. Sacramento's lack of additional diversion capacity would limit its ability to provide surface water to neighboring areas and water purveyors for in-lieu recharge.

Loss of the in-lieu recharge opportunity for conjunctive management combined with the current overdraft in the groundwater basin in the Placer-Sacramento region would result in additional depletion, increasing the potential of water quality deterioration and permanent loss of usable groundwater aquifer. Not only would the conjunctive management envisioned by the WFA be jeopardized, regional water supplies would become increasing unreliable as a result of depleting the supplemental water supply.

CVP Operational Efficiency (Opportunity)

As an integral part of the CVP, Folsom Dam is operated for contract deliveries, flood management, instream flow needs in the lower American River, and water quality needs in the Delta. Operating Folsom Dam for all intended purposes becomes increasingly challenging due to the combined effects of the interim SAFCA flood operation rules, CVPIA, D-1641, and the recent BO.

Lower American River instream flow requirements were originally defined in SWRCB Decision 893 (D-893). The SWRCB increased the D-893 minimum release schedule through Decision 1400 (D-1400). This decision was applied to the water rights permit for Auburn Dam and does not apply to operation of Folsom and Nimbus dams. However, Reclamation voluntarily operates Folsom and Nimbus dams to meet a modified D-1400 for minimum fishery flows, and more recently has striven to meet the recommended AFRP flows for the lower American River under the CVPIA.

Since 1996, Reclamation has operated according to an interim flood control diagram revised by the Sacramento Area Flood Control Agency (SAFCA). This diagram requires a dynamic allocation of flood

control space from 400,000 to 670,000 AF according to available creditable storage in upstream reservoirs (Hell Hole, Union Valley, and French Meadows).

D-1641 requires that the CVP and SWP meet Delta water quality flow objectives (except for salinity objectives in the southern Delta) until a settlement is reached with other Sacramento Valley water right holders. Currently, Reclamation receives recommendations from the interagency American River Workgroup (AROG) on seasonal fluctuations and ramping of stream flows in the lower American River.

The biological opinion (BO) on interim operations of the CVP and SWP, issued on September 20, 2002, by the National Marine Fisheries Service (NMFS), targets the two species: Central Valley spring-run chinook salmon and Central Valley steelhead. Both species are listed as threatened under the federal ESA, and the Sacramento River and its tributaries, including American River, are considered critical habitat for these species. This BO restates the needs of cold water releases during salmon spawning and rearing seasons, and also singificantly increases the temperature control requirements for the steelhead. This BO sepecifies ramping criteria for releases from Nimbus Dam and requires Reclamation, to the extent possible, to control water temperatures in the lower American River between Nimbus Dam and the Watt Avenue Bridge (River Mile 9.4) from June 1 through November 30 to maintain a daily average temperature of less than or equal to 65ºF to protect rearing juvenile steelhead from thermal stress and from warm-water predator species.

The recent BO may result in a significant conflict for Folsom Dam operations due to the different life stages of these two targeted species at any given time, and there is only limited availability fo cold water in Folsom Lake that could be released to meet temperature requirements for spawning and rearing of both fall-run chinook salmon and steelhead.

Such operational conflicts are likely to intensify as diversions from the American River for in-basin uses increase in the future, as most of future diversions would be at or upstream of Folsom Dam. The resutling reduction in Folsom Lake storage may also reduce CVP operational efficiency by limiting the availability of Folsom Dam releases for Delta water quality needs, thereby increasing reliance on releases from Shasta and Keswick dams. Shifting a number of future American River diversions to an alternate location may partially alleviate pressure on Folsom Dam operations, allowing greater operational flexibility and efficiency.

Ecosystem Preservation in the Lower American River (Opportunity)

Although Reclamation implemented AFRP flow objectives in the lower American River, temperature control problems still exist due to the relatively small coldwater pool available in Folsom Reservoir. With input from the AROG, Reclamation continues to adaptively manage lower American River temperatures through a combination of flow releases and intake shutter operations. The goal of this adaptive management is providing suitable temperatures during the summer months for the Nimbus Fish Hatchery and rearing juvenile steelhead, while minimizing the loss of the coldwater pool remaining for spawning fall-run chinook salmon. Shifting a number of future American River diversions to an alternate location may enhence the opportunity of this adaptive management.

Opportunities to promote Delta ecosystem restoration may exist by shifting a number of future American River diversions to an alternate location; however, such opportunitites may depend on other factors such as SWP actions, lower Sacramento River diversions, the EWA operations, and other ongoing programs and projects. Therefore, the ancillary benefit of promoting ecosystem restoration in the Delta is not identified as an opportunity in the SRWRS.